

**CLAIMS**

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1       1. A double crystal analyzer linkage, comprising:
  - 2               a fixed pivot point;
  - 3               first, second and third sliding axis pivot points constrained to move
  - 4               along spaced apart, parallel first, second and third linear pathways, said
  - 5               fixed pivot point being located on said third pathway between said first and
  - 6               second pathways, distances between said first and third pathways and said
  - 7               second and third pathways being equal;
  - 8               said first and second movable axis pivot points having,
  - 9               respectively, first and second means to secure first and second diffracting
  - 10              crystals so that centroids of said first and second diffracting crystals are
  - 11              located at respective ones of said first and second movable axis pivot
  - 12              points;
  - 13              a right angle slide which is movable along said third pathway, said
  - 14              right angle slide having first and second pathways passing therethrough at
  - 15              right angles to but spaced apart from one another and passing through said
  - 16              third movable axis pivot points;
  - 17              first and second linkages sliding in said first and second pathways
  - 18              of said right angle slide and connected respectively to said first and second
  - 19              means to secure said first and second diffracting crystals so as to constrain
  - 20              planar surfaces of said diffracting crystals to remain parallel to one another
  - 21              as said first and second movable axis pivot points move along said first
  - 22              and second spaced apart, parallel linear pathways;
  - 23              an in-line slide connected to and pivoting about said fixed pivot
  - 24              point, said in-line slide having third and fourth pathways passing
  - 25              therethrough parallel to but spaced apart from one another; and

26           third and fourth linkages sliding in said third and fourth pathways,  
27           respectively, and connected respectively to said first and second means to  
28           secure said first and second diffracting crystals so as to constrain said  
29           diffracting crystals to be equidistant from said fixed pivot point as said  
30           first and second movable axis pivot points move along said spaced apart,  
31           parallel linear pathways.

1           2. The double crystal analyzer linkage recited in claim 1, further  
2           comprising:  
3                 a rotating rod passing through said fixed pivot point and rotating  
4                 with said in-line slide as said in-line slide pivots about said fixed pivot  
5                 point;  
6                 collimator means positioned along said central pathway; and  
7                 a fifth linkage connected between said rotating rod and said  
8                 collimator means, said fifth linkage rotating said collimator means so as to  
9                 pass radiation diffracted from said first diffracting crystal to said second  
10                diffracting crystal as said first and second sliding axis pivot points are slid  
11                along respective ones of said spaced apart, parallel linear pathways.

1           3. The double crystal analyzer linkage as recited in claim 2, wherein said  
2           collimator means comprises a plurality of vanes parallel to one another and  
3           rotating about parallel axes at one half an angle of rotation of first and  
4           second diffracting crystals as said first and second sliding axis pivot points  
5           are slid along respective ones of said spaced apart, parallel linear  
6           pathways.

1           4. The double crystal analyzer linkage recited in claim 1, wherein said first  
2           and second linkages include first and second bell cranks respectively  
3           attached to said first and second means to secure first and second  
4           diffracting crystals, said bell cranks rotating said first and second means to

5 secure first and second diffracting crystals about respective ones of said  
6 first and second sliding axis pivot points as said first and second sliding  
7 axis pivot points move along said spaced apart, parallel linear pathways.

1 5. The double crystal analyzer linkage recited in claim 1, wherein said third  
2 and fourth pathways are in a plane parallel to a plane containing said  
3 spaced apart, parallel linear pathways and said third and fourth linkages  
4 include first and second attachment points offset from respective ones of  
5 said first and second sliding axis points.

1 6. The double crystal analyzer linkage recited in claim 1, wherein said third  
2 and fourth pathways are in a plane vertical to a plane containing said  
3 spaced apart, parallel linear pathways and said third and fourth linkages are  
4 connected to respective points passing through said first and second sliding  
5 axis pivot points.

1 7. The double crystal analyzer linkage recited in claim 1, wherein said first  
2 and second linkages include first and second bell cranks respectively  
3 attached to said first and second means to secure first and second  
4 diffracting crystals, said bell cranks rotating said first and second means to  
5 secure first and second diffracting crystals about respective ones of said  
6 first and second sliding axis pivot points as said first and second sliding  
7 axis pivot points move along said spaced apart, parallel linear pathways  
8 and wherein said third and fourth pathways are in a plane parallel to a  
9 plane containing said spaced apart, parallel linear pathways and said third  
10 and fourth linkages include first and second attachment points offset from  
11 respective ones of said first and second sliding axis points.

1 8. The double crystal analyzer linkage recited in claim 7, further  
2 comprising:

3 a rotating rod passing through said fixed pivot point and rotating  
4 with said in-line slide as said in-line slide pivots about said fixed pivot  
5 point;

6 collimator means positioned along said central pathway; and  
7 a fifth linkage connected between said rotating rod and said  
8 collimator means, said fifth linkage rotating said collimator means so as to  
9 pass radiation diffracted from said first diffracting crystal to said second  
10 diffracting crystal as said first and second sliding axis pivot points are slid  
11 along respective ones of said spaced apart, parallel linear pathways.

1 9. The double crystal analyzer linkage as recited in claim 8, wherein said  
2 collimator means comprises a plurality of vanes parallel to one another and  
3 rotating about parallel axes at one half an angle of rotation of first and  
4 second diffracting crystals as said first and second sliding axis pivot points  
5 are slid along respective ones of said spaced apart, parallel linear  
6 pathways.

1 10. The double crystal analyzer linkage recited in claim 1, wherein said  
2 first and second linkages include first and second bell cranks respectively  
3 attached to said first and second means to secure first and second  
4 diffracting crystals, said bell cranks rotating said first and second means to  
5 secure first and second diffracting crystals about respective ones of said  
6 first and second sliding axis pivot points as said first and second sliding  
7 axis pivot points move along said spaced apart, parallel linear pathways  
8 and wherein said third and fourth pathways are in a plane vertical to a  
9 plane containing said spaced apart, parallel linear pathways and said third  
10 and fourth linkages are connected to respective points passing through said  
11 first and second sliding axis pivot points.

1. 11. The double crystal analyzer linkage recited in claim 10, further  
2 comprising:  
3 a rotating rod passing through said fixed pivot point and rotating  
4 with said in-line slide as said in-line slide pivots about said fixed pivot  
5 point;  
6 collimator means positioned along said central pathway; and  
7 a fifth linkage connected between said rotating rod and said  
8 collimator means, said fifth linkage rotating said collimator means so as to  
9 pass radiation diffracted from said first diffracting crystal to said second  
10 diffracting crystal as said first and second sliding axis pivot points are slid  
11 along respective ones of said spaced apart, parallel linear pathways.
- 1 12. The double crystal analyzer linkage as recited in claim 11, wherein said  
2 collimator means comprises a plurality of vanes parallel to one another and  
3 rotating about parallel axes at one half an angle of rotation of first and  
4 second diffracting crystals as said first and second sliding axis pivot points  
5 are slid along respective ones of said spaced apart, parallel linear  
6 pathways.